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| **8th Grade Math - Sequencing the Common Core Standards** | | | | | | | | |
| **Units** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **Transformations, Congruence, and Similarity** | **Geometric Applications of Exponents** | **Developing Linear Functions** | **Linear Models and Tables** | **Linear Applications** | **Solving Systems of Equations** | **Exponents** | **Show What We Know** |
| **Standards** | 8 G 1  8 G 2  8 G 3  8 G 4  8 G 5 | 8 G 6  8 G 7  8 G 8  8 G 9  8 EE 2  8 NS 1  8 NS 2 | 8 F 1  8 F 2  8 EE 7a  8 EE 7b | 8 EE 5  8 EE 6  8 EE 7  8 F 3 | 8 F 4  8 F 5  8 SP 1  8 SP 2  8 SP 3  8 SP 4  8 EE 7 | 8 EE 7  8 EE 8a  8 EE 8b  8 EE 8c | 8 EE 1  8 EE 2  8 EE 3  8 EE 4 | ALL!  Plus Year-end Review and High School Prep:   * Inequalities * Exponent rules * Word problems * Expressions * Exponential graphs * Graphing calculators |
| **Supporting Materials** | **Course 3 book:** 8.1-8.8 and  **EFS materials** | **Course 3 book:**  9.1-9.4, 10.6-10.7,  and  **EFS materials** | **Course 3 book:**  2.7, 3.1-3.5, 6.1-6.3, and **Algebra 1 book:**  3.4, THEN **PFC and Navigations materials**  and  **Course 3 book:**  11.1 | **Course 3 book:**  11.1  11.3-11.7 THEN **Algebra 1 book:**  10.8 | **Course 3 book:**  11.2  and scatter plot materials from Navigating Through Data or Algebra  **Bivariate Data**  Two-Way Frequency Table materials | **Algebra 1 book:**  Rewriting equations  4.5  Solving systems  7.1-7.5 | **Course 3 book:**  1.4,  4.6-4.8,  and **Algebra 1 book:**  8.1-8.3 |  |

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| **Units** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **Transformations, Congruence, and Similarity** | **Geometric Applications of Exponents** | **Developing Linear Functions** | **Linear Models and Tables** | **Linear Applications** | **Solving Systems of Equations** | **Exponents** | **Show What We Know** |
| **Vocabulary** | Angle, similar, congruent, corresponding, transformation, image, translation, reflection, dilation, scale, perpendicular, parallel, 2D, perimeter, area, base (2D),  height (2D), proportional, rotation, exterior angle, angle sum, coordinate plane, unit rate, transversal, acute angle, alternate exterior angle, alternate interior angle, angle, ASA, SSS, SAS, complementary angles, corresponding angles, diameter, equilateral triangle, equivalent ratio, hexagon, heptagon, octagon, rectangle, rhombus, parallelogram, polygon, regular | Leg, hypotenuse, Pythagorean Theorem, converse, volume, pyramid, 3D, cone, power, exponent,  Base (of an exponent), square, square root, radical, perfect square, rational, irrational,  real number, surface area, integer exponent, cylinder, sphere, base (3D), height (3D), cube root, prism, Pythagorean Triple, radical expression, radical symbol | Distributive property, terms,  like terms, coefficient, constant term, variable, expression, equation, solution, equivalent, factor, inverse operation, combining like terms, equivalent expression, equivalent equation, integer | Relation, function, domain, range, input, output, linear,  x-intercept,  y-intercept, slope, rise and run,  rate of change,  slope-intercept form, exponential,  quadratic, non-linear, linear equation, graphing ordered pairs, ordered pairs, direct variation, exponential function, linear function, quadratic function, rate | Scatterplot, positive correlation, negative correlation, no correlation, trend line (line of best fit), bivariate, outlier, linear association, frequency, strong correlation, two-way table, univariate | System of linear equations, solution to a system, standard form, substitution, intersection | Power, base (of an exponent),  exponent, scientific notation, decimal, order of magnitude |  |

**Unit 1 vocab continued:** polygon, regular polygon, isosceles triangle, scalene triangle, radius, line of symmetry, obtuse, vertical angles, trapezoid, proportion, quadrilateral, ratio, scale factor, scale model, straight angle, supplementary angles.**8th GRADE**

**8 Mathematical Practices**

* Make sense of problems and persevere in solving them
* Reason abstractly and quantitatively.
* Construct viable arguments and critique the reasoning of others.
* Model with mathematics.
* Use appropriate tools strategically.
* Attend to precision.
* Look for and make use of structure.
* Look for and express regularity in repeated reasoning.

| **Unit** | **Clusters** | **Standards** | **Material Alignment** | **Additional** |
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| **Unit 1**  **Transformations, Congruence, and Similarity** | Understand congruence and similarity using physical models, transparencies, or geometry software | **8.G.1** Verify experimentally the properties of rotations, reflections, and translations:  **a.** Lines are taken to lines, and line segments to line segments of the same length.  **b.** Angles are taken to angles of the same measure.  **c.** Parallel lines are taken to parallel lines.  **8.G.2** Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.  **8.G.3** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.  **8.G.4**  Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.  **8.G.5** Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals  why this is so | **Course 3 book:** 8.1-8.8  And  EFS activities    **Course 3 book:** 8.1-8.8  And  EFS activities  **Course 3 book:** 8.1-8.8  And  EFS activities  **Course 3 book:** 8.1-8.8  And  EFS activities  **Course 3 book:** 8.1-8.8  And  EFS activities | *(lllustrative Mathematics)*   * Find the Missing Angle * Congruent Segments   *Use activities from the DMI class called “Examining Features of Shapes”*  *OPI – IEFA*   * Stars in the Sky * Making a Star Quilt * Native American Designs * Geometric Beadwork * Tipi Geometry & Trigonometry   *Navigating Through Algebra book*   * Rotational Symmetry and Regular Polygons * Using Scale Factors * Translations, Reflections, and Rotations * Reflection of Images * Dilating Figures * Congruent and Similar Shapes * Piecing Ideas Together * Pick’s Theorem   [*http://www.sgsd.k12.wi.us/Curriculum/Math/Math\_Middle\_Performance\_Assessments.htm*](http://www.sgsd.k12.wi.us/Curriculum/Math/Math_Middle_Performance_Assessments.htm)   * Understanding the Shape of Things |
| **Unit 2**  Geometric Applications of Exponents | Understand and apply the Pythagorean Theorem | **8.G.6** Explain a proof of the Pythagorean Theorem and its converse.  **8.G.7** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.  **8.G.8** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. | **Course 3 book:**  9.1-9.4,  10.6-10.7  And  EFS activities | *(lllustrative Mathematics)*   * Converse of the Pythagorean Theorem   *From the 8th grade math adopted text:*   * P. 514 |
|  | Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres | **8.G.9** Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems | **Course 3 book:**  10.6-10.7,  Extension for 10.7 | *Use activities from the DMI class called “Examining Features of Shapes”*  *Navigating Through Geometry*   * Constructing Three- Dimensional Figures   *OPI – IEFA*   * Surface Area and Volume of Traditional American Indian Homes   *From the 8th grade math adopted text:*   * P. 574 * P. 577 #3, 4, 13 |
|  |  | **8.EE.2** Use square root and cube root symbols to represent solutions to equations of the form x 2 = p and x 3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational. | \*\* The focus for this Standard in this Unit is on square roots  **Course 3 book:**  9.1-9.2 | ***Illustrative mathematics web site:***   * Sore Throats |
|  |  | **8.NS.1** Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that the other numbers are called irrational  **8.NS.2** Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions. For example, by truncating the decimal expansion of -, show that – is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations. | **Course 3 book:**  9.2  **Course 3 book:**  9.2 | *HCPSS Worthwhile Math Tasks:*   * Discovering Pi   *HCPSS Worthwhile Math Tasks:*   * The Code Name Organizer * Patio Predicament |
| **Unit 3**  Developing linear Functions | Define, evaluate, and compare functions | **8.F.1** Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.  **8.F.2** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. | **Course 3 book:**  2.7, 3.1-3.5, 6.1-6.3, and **Algebra 1 book:**  3.4, THEN **PFC and Navigations materials**  and  **Course 3 book:** 11.1 | *Use activities from the DMI class called “Patterns, Function, and Change”*  *From the 8th grade math adopted text:*   * P. 110 #1, 15 |
|  | Understand the connections between proportional relationships, lines, and linear equations. | **8.EE.7** Solve linear equations in one variable.  **a.** Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).  **b.** Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. | **Course 3 book:**  1.5-1.6,  3.1-3.5,  6.1-6.4  \*\*\* Make sure to add infinite solutions and no solutions  **Course 3 book:**  1.5-1.6,  3.1-3.5,  6.1-6.4 | *Use activities from the DMI class called “Patterns, Function, and Change”* |
| **Unit 4**  Linear Models and Tables | Understand the connections between proportional relationships, lines, and linear equations | **8.EE.5** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.  **8.EE.6** Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b. | **Course 3 book:**  11.2-11.7 THEN **Algebra 1 book:** 10.8  \*\*The focus in this unit is the forms of linear equations with their various representations  **Course 3 book:**  8.8  \*\*\* Need to supplement | *(lllustrative Mathematics)*   * Cell Phone Plans * Compare Speed * Find the Change * Function Rules * Modeling with Linear Functions * Foxes & Rabbits   *Navigations Through Numbers and Operations book*   * Using Unit Rate to Solve Problems * Changing Rates * Proposing a Proportional Plan * Exchanging Currency * Getting a Grip on Graphs * Pouring Over Patterns   *From the 8th grade math adopted text:*   * P. 338 #1, 3, 4, 5, and 12-13   *From the Algebra 1 adopted text:*   * P. 694 #1 * P. 705 #11   *Use activities from the DMI class called “Examining Features of Shapes”* |
|  | Analyze and solve linear equations and pairs of simultaneous linear equations | **8.EE.7** Solve linear equations in one variable.  **a.** Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).  **b.** Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. | **Course 3 book:**  1.5-1.6,  3.1-3.5,  6.1-6.4  \*\*\* Need to add infinite solutions and no solution  **Course 3 book:**  1.5-1.6,  3.1-3.5,  6.1-6.4 | *Use activities from the DMI class called “Patterns, Function, and Change”* |
|  | Define, evaluate, and compare functions | **8.F.3** Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function A = s 2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1),  (2,4) and (3,9), which are not on a straight line | **Course 3 book:**  11.3-11.7 | *(lllustrative Mathematics)*   * Function Rules * Modeling with Linear Functions * Foxes & Rabbits   *Use activities from the DMI class called “Patterns, Function, and Change”* |
| **Unit 5**  Linear Applications | Use functions to model relationships between quantities | **8.F.4** Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.  **8.F.5** Describe qualitatively the functional relationship between two quantities by analyzing a graph  (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. | **Course 3 book:**  11.2  **Course 3 book:**  11.2 | *(lllustrative Mathematics)*   * Baseball Cards * Video Streaming * Battery Charging * NCTM Illuminations web site activity “What’s the Function?” |
|  | Investigate patterns of association in bivariate data | **8.SP.1**. Construct and interpret scatter plots forbivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.  **8.SP.2** Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.  **8.SP.3** Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5cm/hr as meaning that an additional hour of sunlighteach day is associated with an additional 1.5 cm in mature plant height.  **8.SP.4** Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two way table summarizing data on two categorical variables collected from the same subjects. Use relative frequenciescalculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores. | **Course 3 book:**  11.2  **Course 3 book:**  11.2  **See Bivariate Data folder on Y drive**  **See Bivariate Data folder on Y drive** | *(lllustrative Mathematics)*   * Texting and Grades * Birds’ Eggs * Battery Charging * Music & Sports   *Use activities from the DMI class called “Patterns, Function, and Change”*  *Navigating Through Data Analysis*   * Olympic Gold Times * Prediction * People, Congress and Pizza * Reading a Scatterplot * Stopping Distances * Batteries * Students and Basketball Players * TV Watching   *OPI – IEFA*   * Reservation Land Areas * Montana Native American Populations * Ko’ko’hasenestotse   *From the 8th grade math adopted text:*   * P. 645 #16-17   **See Bivariate Data folder on Y drive** |
|  | Analyze and solve linear equations and pairs of simultaneous linear equations | **8.EE.7** Solve linear equations in one variable.  **a.** Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).  **b.** Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. | \*\*The focus for this Standard in this Unit is real-world application | *Use activities from the DMI class called “Patterns, Function, and Change”* |
| **Unit 6**  Solving Systems of Equations | Analyze and solve linear equations and pairs of simultaneous linear equations | **8.EE.7** Solve linear equations in one variable.  **a.** Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).  **b.** Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. | \*\*Make sure to pre-teach rewriting equations in function form before this if you haven’t already.    \*\*The focus in this unit is systems of equations.  **Algebra 1 book:**  7.1-7.5 | *(lllustrative Mathematics)*   * Quinoa Pasta 1   *MAP*   * Building & Solving Equations 1   *Use activities from the DMI class called “Patterns, Function, and Change”*  *From the Algebra 1adopted text:*   * P. 482 #12, 14-15 * P. 458 #2, 4   *Noyce Foundation*   * Squares and Circles |
|  |  | **8.EE.8** Analyze and solve pairs of simultaneous linear equations.  **a.** Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.  **b.** Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.  **c.** Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair. | **Course 3 book:**  p. 627-628  **Algebra 1 book:**  7.1  **Course 3 book:**  p. 627-628  **Algebra 1 book:**  7.1-7.3 | *(lllustrative Mathematics)*   * Quinoa Pasta 1   *Use activities from the DMI class called “Patterns, Function, and Change”* |
| **Unit 7**  Exponents | Work with radicals and integer exponents | **8.EE.1** Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 32  × 3 –5 = 3 –3 = 1/3 3 = 1/27.  **8.EE.2** Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.  **8.EE.3** Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 × 108 and the population of the world as 7 × 109, and determine that the world population is more than 20 times larger.  **8.EE.4** Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. | **Course 3 book:**  1.4,  4.6-4.8,  and  **Algebra 1 book:**  8.1-8.2  **Course 3 book:**  9.1  **Course 3 book:**  4.8  **Algebra 1 book:**  8.4 | *(lllustrative Mathematics)*   * Giantburgers * Extending the Definitions of Exponents Variation 1   *MAP website*   * Golden Crown   *From the 8th grade math adopted text:*   * P. 228 #3, 9, 15   *MAP website*   * 100 People   *From the Algebra 1 adopted text:*   * P. 550 #3-7, 16, 19 |